

WHAT IS CLAIMED IS:

- 1                    1.     A method for managing connections in a network comprising:  
2                    receiving a packet associated with a request for a protocol-based  
3                    connection;  
4                    assigning the packet to a selected one of a plurality of classes;  
5                    forwarding the packet if number of packets forwarded from the selected  
6                    class in a predetermined time interval has not reached a first maximum count; and  
7                    dropping the packet if number of packets forwarded from the class in the  
8                    predetermined time interval has reached the first maximum count.
- 1                    2.     The method of claim 1 wherein the first maximum count is  
2                    adjustable to effectuate different rates of packet forwarding for the selected class.
- 1                    3.     The method of claim 1 wherein the predetermined time interval  
2                    is adjustable to effectuate different rates of packet forwarding for the selected class.
- 1                    4.     The method of claim 1 wherein a counter associated with the  
2                    selected class is used to determine whether number of packets forwarded from the  
3                    selected class in the predetermined time interval has reached the first maximum count.
- 1                    5.     The method of claim 4 wherein the counter is a count-down  
2                    counter.
- 1                    6.     The method of claim 1 wherein the packet is forwarded only if a  
2                    count of active connection requests has not reached a second maximum limit.
- 1                    7.     The method of claim 6 wherein the count of active connection  
2                    requests is incremented when a packet associated with a request for a protocol-based  
3                    connection is forwarded from the selected class.
- 1                    8.     The method of claim 6 wherein the count of active connection  
2                    requests is decremented when a protocol-based connection is established.
- 1                    9.     The method of claim 6 wherein the count of active connection  
2                    requests is decremented when a protocol-based connection is terminated before being  
3                    established.

1                   10.    The method of claim 1 further comprising:  
2                   after forwarding the packet, receiving an additional packet associated  
3 with the requested protocol-based connection;  
4                   assigning the additional packet to a pass-through class; and  
5                   forwarding the additional packet even if the first maximum count or the  
6 second maximum count has been reached.

1                   11.    The method of claim 10 wherein the additional packet relates to  
2 status of the requested protocol-based connection.

1                   12.    The method of claim 10 wherein the additional packet relates to  
2 termination of the requested protocol-based connection.

1                   13.    The method of claim 1 wherein the protocol-based connection is  
2 based on a Point-to-Point Protocol (PPP).

1                   14.    The method of claim 1 wherein the protocol-based connection is  
2 based on a Point-to-Point Protocol over Ethernet (PPPoE).

1                   15.    The method of claim 1 wherein the protocol-based connection is  
2 based on a Layer Two Tunneling Protocol (L2TP).

1                   16.    The method of claim 1 wherein the protocol-based connection is  
2 based on a Dynamic Host Configuration Protocol (DHCP).

1                   17.    An apparatus for managing connections in a network comprising:  
2 a control plane operable to process requests for protocol-based  
3 connection; and  
4 a data plane operable to  
5 receive a packet associated with a request for a protocol-based  
6 connection,  
7 assign the packet to a selected one of a plurality of classes,  
8 forward the packet to the control plane if number of packets forwarded  
9 from the selected class in a predetermined time interval has not reached a first  
10 maximum count, and

11 drop the packet if number of packets forwarded from the class in the  
12 predetermined time interval has reached the first maximum count.

1 18. The apparatus of claim 17 wherein the first maximum count is  
2 adjustable to effectuate different rates of packet forwarding for the selected class.

1 19. The apparatus of claim 17 wherein the predetermined time  
2 interval is adjustable to effectuate different rates of packet forwarding for the selected  
3 class.

1 20. The apparatus of claim 17 wherein a counter associated with the  
2 selected class is used to determine whether number of packets forwarded from the  
3 selected class in the predetermined time interval has reached the first maximum count.

1 21. The apparatus of claim 20 wherein the counter is a count-down  
2 counter.

1 22. The apparatus of claim 17 wherein the packet is forwarded only  
2 if a count of active connection requests has not reached a second maximum limit.

1 23. The apparatus of claim 22 wherein the count of active connection  
2 requests is incremented when a packet associated with a request for a protocol-based  
3 connection is forwarded from the selected class.

1 24. The apparatus of claim 22 wherein the count of active connection  
2 requests is decremented when a protocol-based connection is established.

1 25. The apparatus of claim 22 wherein the count of active connection  
2 requests is decremented when a protocol-based connection is terminated before being  
3 established.

1 26. The apparatus of claim 17 further comprising:  
2 after forwarding the packet, receiving an additional packet associated  
3 with the requested protocol-based connection;  
4 assigning the additional packet to a pass-through class; and  
5 forwarding the additional packet even if the first maximum count or the  
6 second maximum count has been reached.

- 1                    27.    The apparatus of claim 26 wherein the additional packet relates  
2    to status of the requested protocol-based connection.
- 1                    28.    The apparatus of claim 26 wherein the additional packet relates  
2    to termination of the requested protocol-based connection.
- 1                    29.    The apparatus of claim 17 wherein the protocol-based connection  
2    is based on a Point-to-Point Protocol (PPP).
- 1                    30.    The apparatus of claim 17 wherein the protocol-based connection  
2    is based on a Point-to-Point Protocol over Ethernet (PPPoE).
- 1                    31.    The apparatus of claim 17 wherein the protocol-based connection  
2    is based on a Layer Two Tunneling Protocol (L2TP).
- 1                    32.    The apparatus of claim 17 wherein the protocol-based connection  
2    is based on a Dynamic Host Configuration Protocol (DHCP).
- 1                    33.    A system for managing connections in a network comprising:  
2                    means for receiving a packet associated with a request for a protocol-  
3    based connection;  
4                    means for assigning the packet to a selected one of a plurality of classes;  
5                    means for forwarding the packet if number of packets forwarded from  
6    the selected class in a predetermined time interval has not reached a first maximum  
7    count; and  
8                    means for dropping the packet if number of packets forwarded from the  
9    class in the predetermined time interval has reached the first maximum count.